

Spring 2010 Climate Summary For Southwest Lower Michigan

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Overview

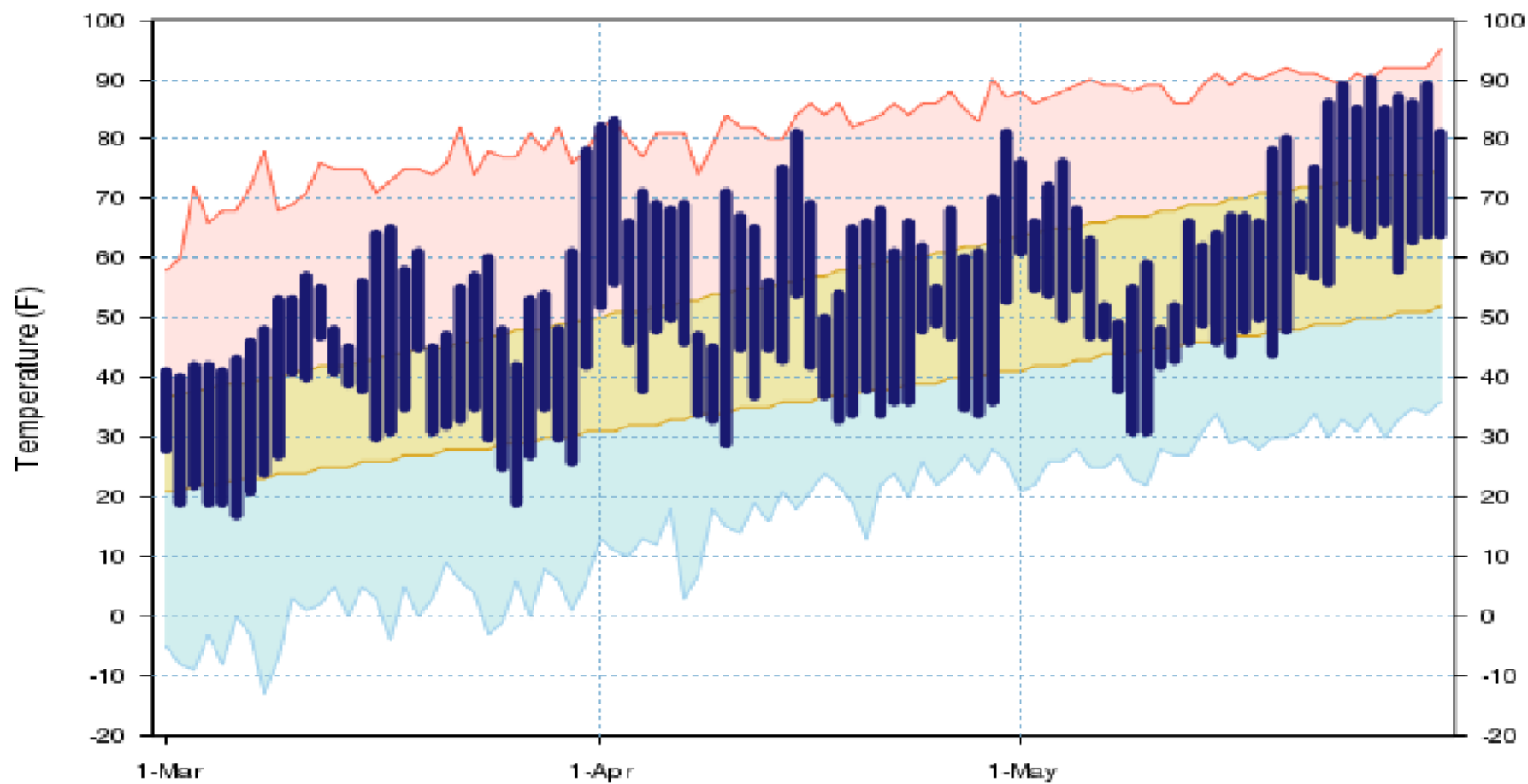
The 2010 spring season (March through May) for Southwest Lower Michigan was the third warmest spring since records began in 1892. Precipitation was below normal in central and northern portions of the forecast area and near normal over the southern third. Snowfall was well below normal, similar to the spring of 2009. The severe storm frequency remained below normal for the second spring in a row.

Location		Temperature (F)	Precipitation (inches)	Snowfall (inches)
Grand Rapids	<i>Reported</i>	52.1°	8.78	2.0
	<i>Normal</i>	46.3°	9.42	11.8
	<i>Departure</i>	+5.8°	-0.64	-9.8
Lansing	<i>Reported</i>	50.9°	7.12	1.2
	<i>Normal</i>	45.5°	8.13	11.2
	<i>Departure</i>	+5.4°	-1.01	-10.0
Muskegon	<i>Reported</i>	50.4°	6.10	0.4
	<i>Normal</i>	45.0°	8.22	14.2
	<i>Departure</i>	+5.4°	-2.12	-13.8

TABLE 1. Reported temperature, precipitation and snowfall amounts for the spring of 2010 at the primary climate stations in Southwest Lower Michigan. Normals are computed from 30-year averages from 1971-2000.

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Temperature Summary for Grand Rapids Area Mar 1, 2010 - May 31, 2010



Observed daily maximum and minimum temperatures are connected by dark blue bars.
Area between normal maximum and minimum temperatures has tan shading.
Red line connects record high temperatures. Light blue line connects record low temperatures.

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Average Temperature Departure from Mean in Degrees F
March 1, 2010 to May 31, 2010

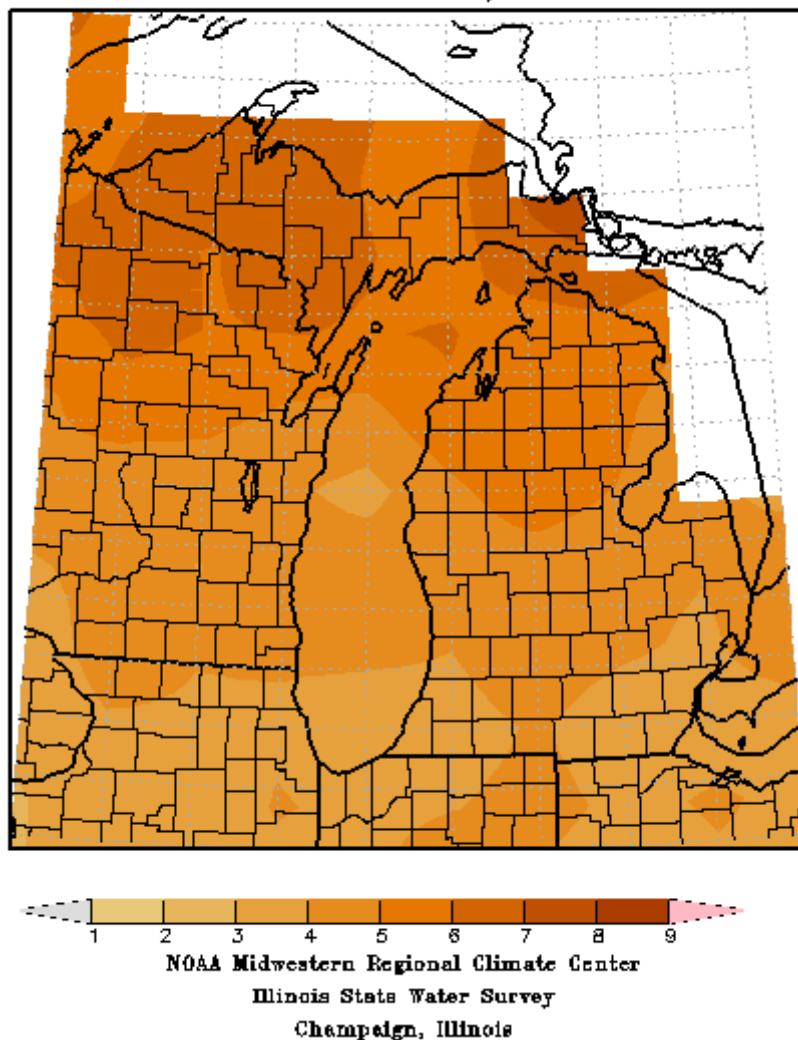


Figure 1. The spring 2010 daily mean temperature departure from normal for Michigan.

The spring mean temperature across the area was 50.1°F, which was 4.9°F warmer than the 1971 to 2000 normal (Figure 1). In comparison, the spring of 2009 was relatively close to normal, being only 0.8°F above normal over Southwest Lower Michigan. The NCDC state ranking map (Figure 2) shows Michigan, along with much of New England, had the warmest spring in 116 years of records.

March-May 2010 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA

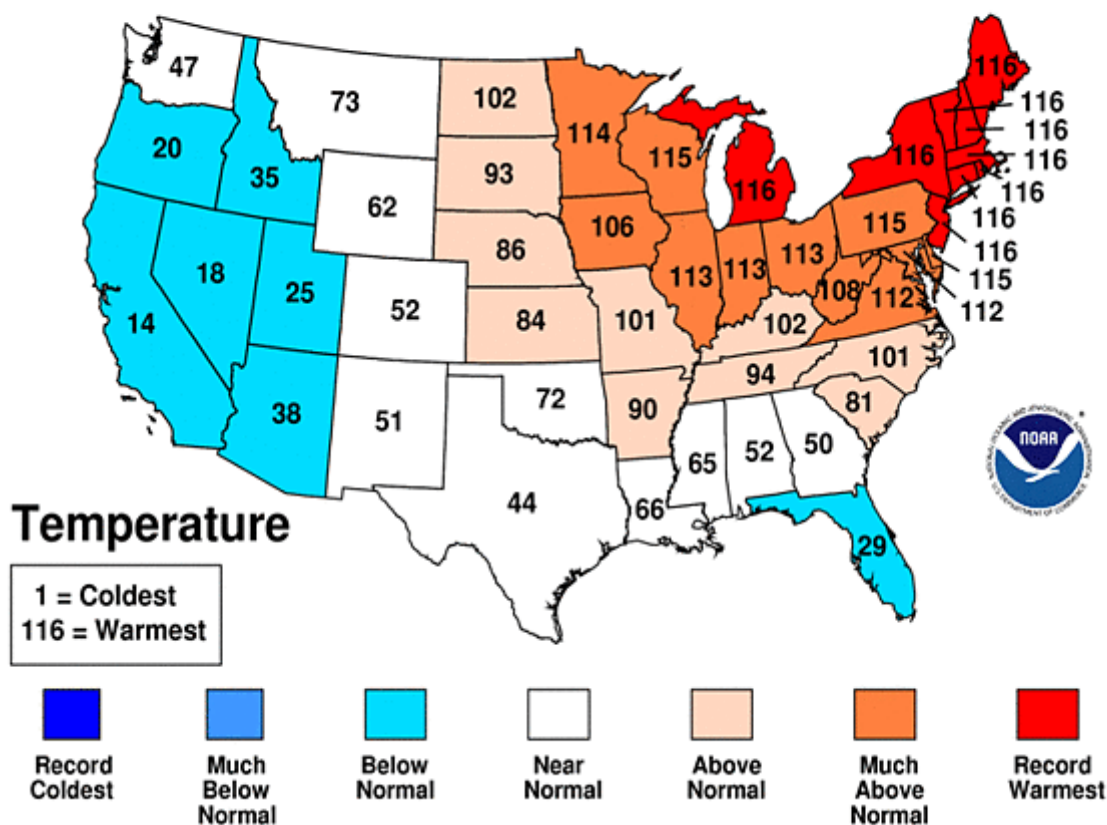


Figure 2. The spring 2010 NCDC temperature ranking for the contiguous United States.

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Using every spring from 1950 through 2010 for the 36 long-term climate stations across Southwest Lower Michigan, the spring of 2010 was the third warmest on record (Figure 3). The recent trend toward warmer springs has continued. Six of the past ten springs were warmer than normal, while only one spring was in the bottom third. This differs from the predominantly cooler than normal springs that occurred from 1950 through 1984. The official 10-year temperature trend from the Climate Prediction Center shows a warming trend over much of the Great Lakes (Figure 4).

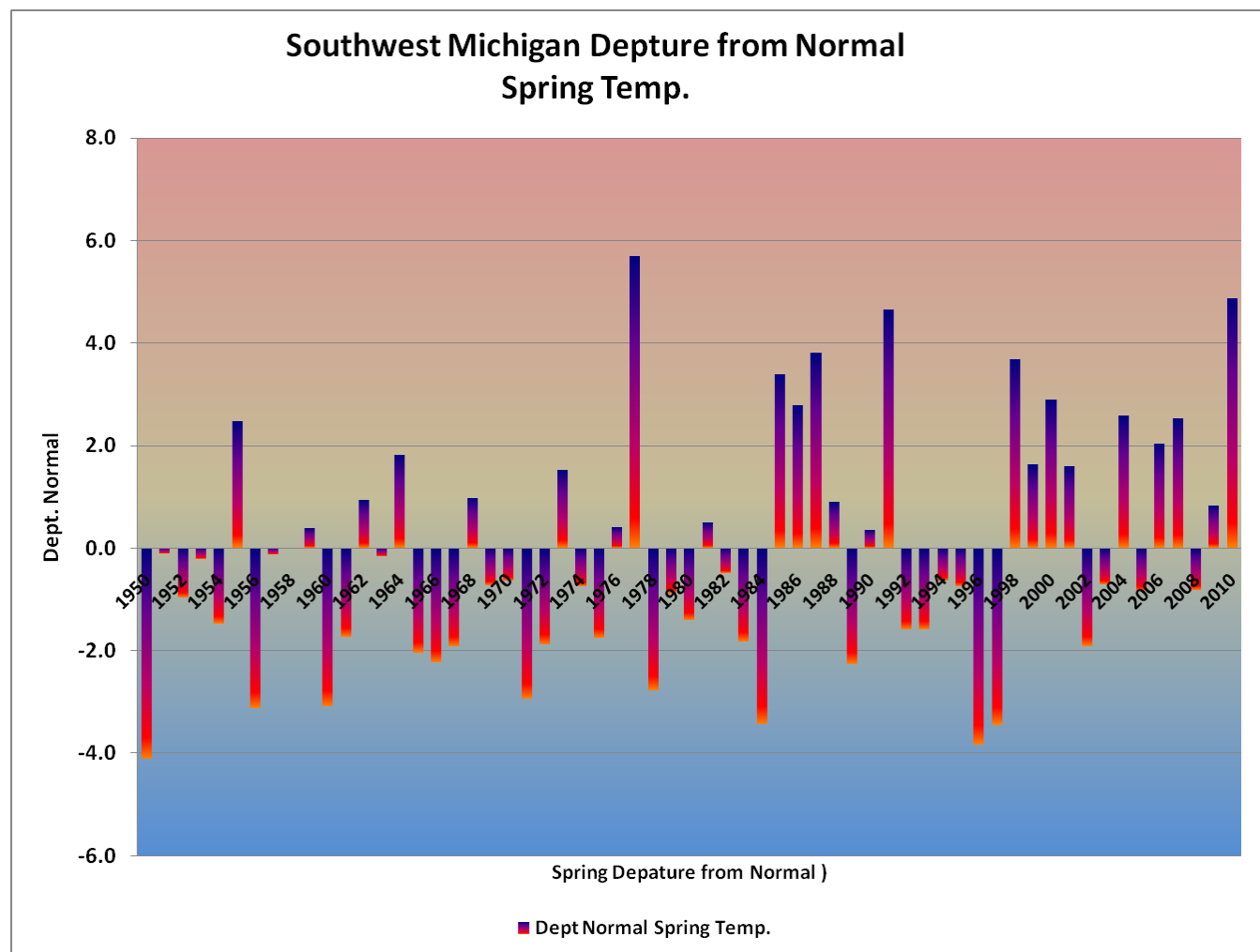


Figure 3. Spring mean area temperature departure from normal for all of Southwest Lower Michigan long-term climate stations from 1950 through 2010.

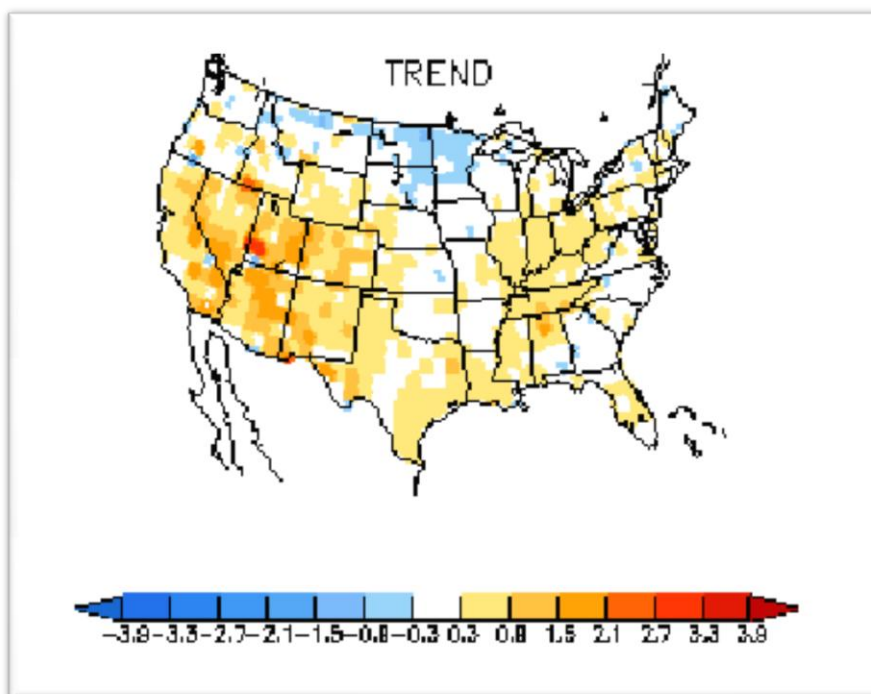


Figure 4. Temperature trend (mean temperature from 2001-2010 minus the mean temperature from 1971-2000) from March through May across the Contiguous United States.

Daily mean temperatures were well above normal at all three primary climate stations (Figures 5-7). April at both Grand Rapids and Muskegon had a mean temperature of 7.4 degrees above normal. That was the warmest departure from normal for any month since December 2006 at Grand Rapids and Muskegon. For Lansing, the 6.8 degrees above normal was the highest departure from normal since January of 2006, which was 11.6 degrees above normal.

At Grand Rapids and Lansing there were fourteen days with highs at or above 80 degrees. At Muskegon there were eight days with highs of 80 degrees or more. This was the sixth greatest number in the 116 years of data at Grand Rapids. At Grand Rapids and Lansing there are normally seven days with highs of 80 degrees or warmer. At Muskegon there are normally four days with highs of 80 degrees or warmer. At all three locations, the number of days with highs of 80 degrees or more was double normal. By comparison, the total number of days with highs of at least 80 degrees in 2009 was less than half the normal at Grand Rapids and Lansing, while Muskegon had no such days.

The largest cold spell during the spring was from the 8th through the 12th of April. During that time the daily departure from normal was ten or more degrees below normal each day. It was the longest string of such days for the year to date.

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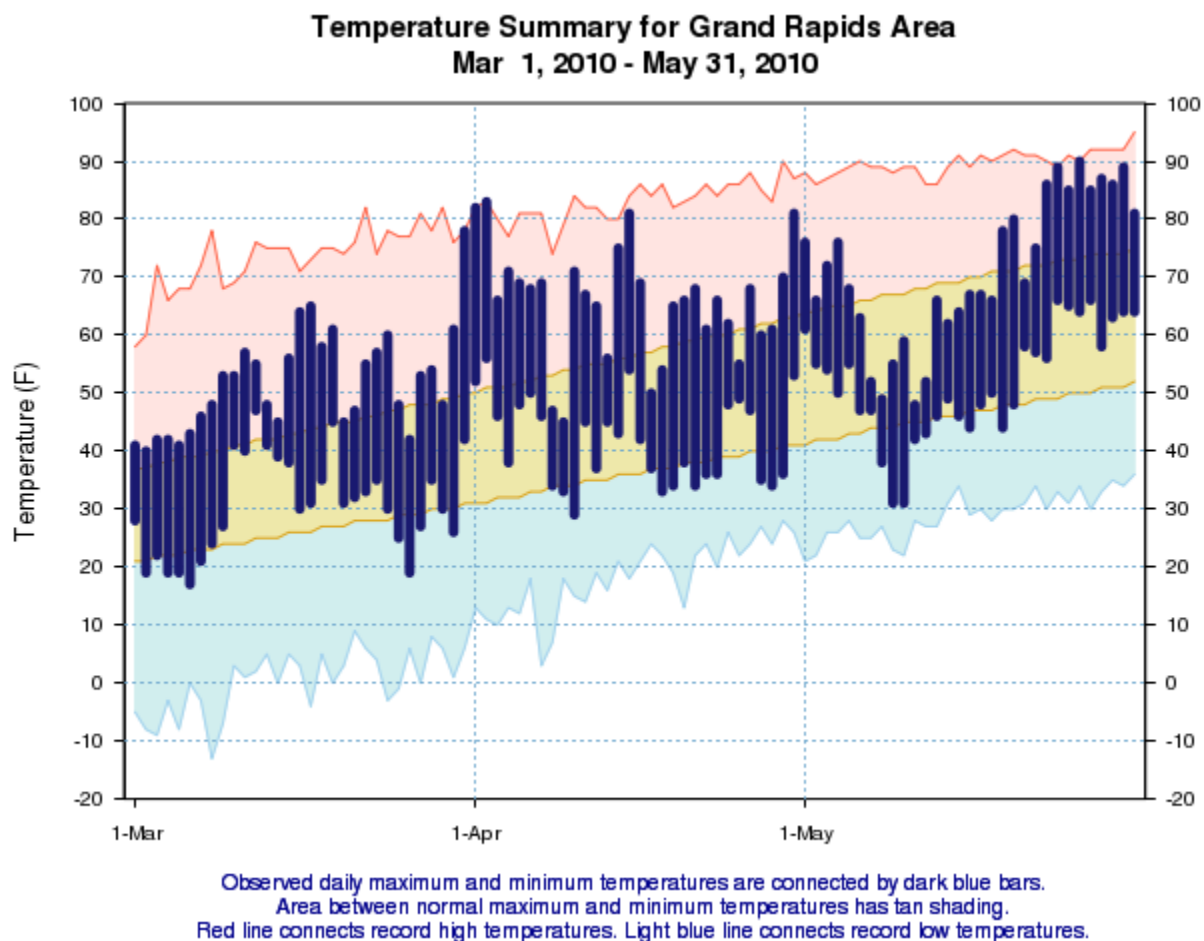
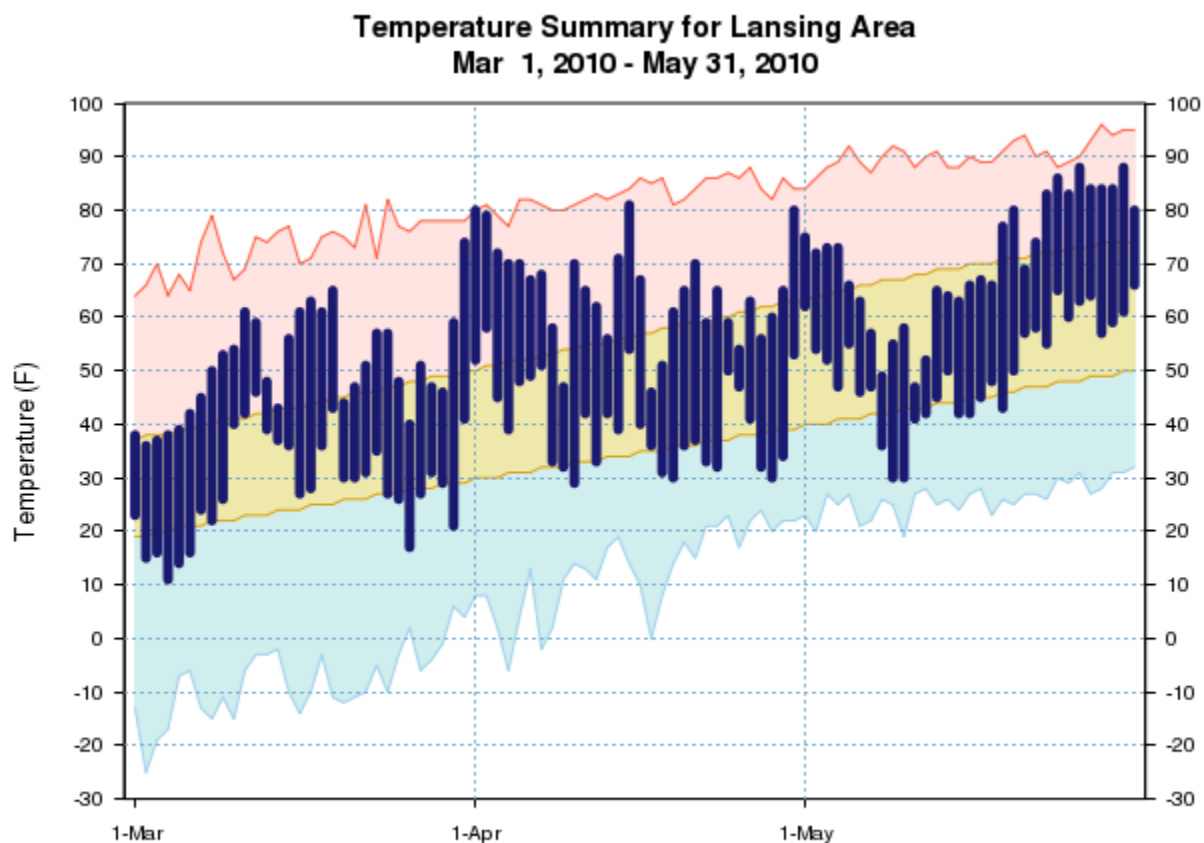


Figure 5. Spring 2010 observed daily maximum and minimum temperatures. Please see blue text above for a description of the figure.

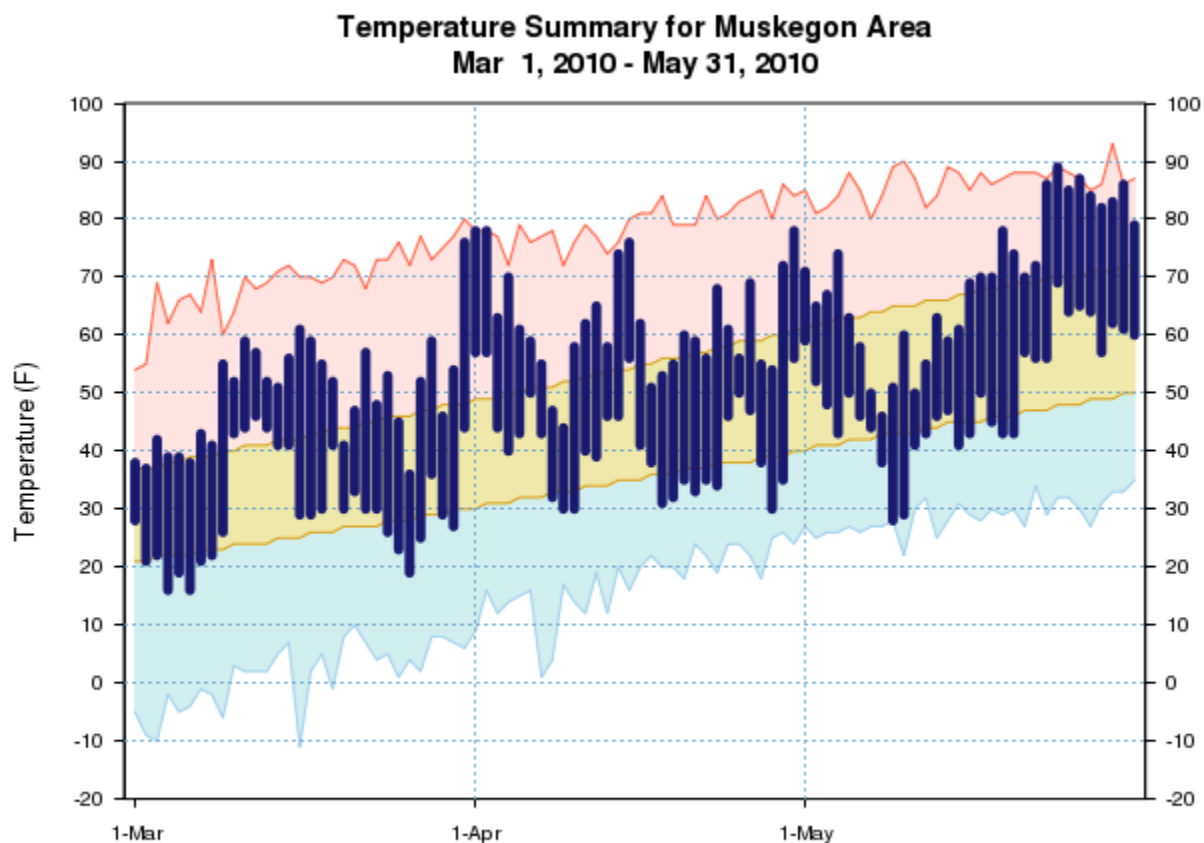
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Observed daily maximum and minimum temperatures are connected by dark blue bars.
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Red line connects record high temperatures. Light blue line connects record low temperatures.

Figure 6. Same as Figure 5, expect for Lansing.

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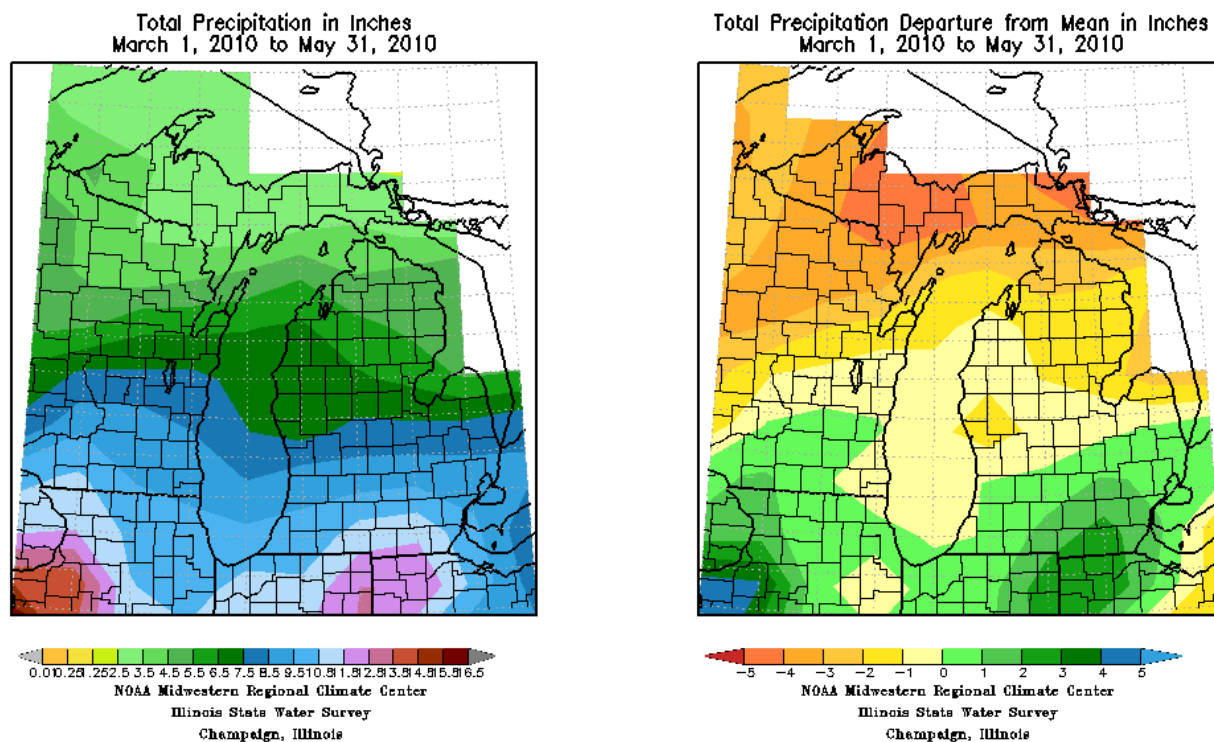


Observed daily maximum and minimum temperatures are connected by dark blue bars.
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Figure 7. Same as Figure 5, except for Muskegon.

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Spring 2010 Precipitation for Southwest Lower Michigan:



8a 8b
Figure 8. Spring 2010 total precipitation (8a) and departure from normal (8b).

Precipitation ranged from around 10 inches south of Jackson to around 6 inches northeast of Clare (Figure 8a). Most locations north of Interstate 96 were from one to two inches below normal (Figure 8b), which is a sharp contrast to the wet spring of 2009. During the spring of 2009 some locations in west central Lower Michigan were over seven inches above normal.

Of the last 10 springs, five were wetter than normal, three (including the spring of 2010) were drier than normal and two were near normal (Figure 9). This is also shown well by the NCDC state rankings map (Figure 10) which shows Michigan as the 13th driest on record out of 116 years of data. The trend toward wetter springs shows up strongly in the Climate Prediction Center's spring trend map (Figure 11). However, while the spring of 2010 seems to go against the recent trend, part of the reason is the El Niño, which continued through the winter and ended late this spring. Typically, an El Niño spring in Michigan is drier than normal (Figure 12).

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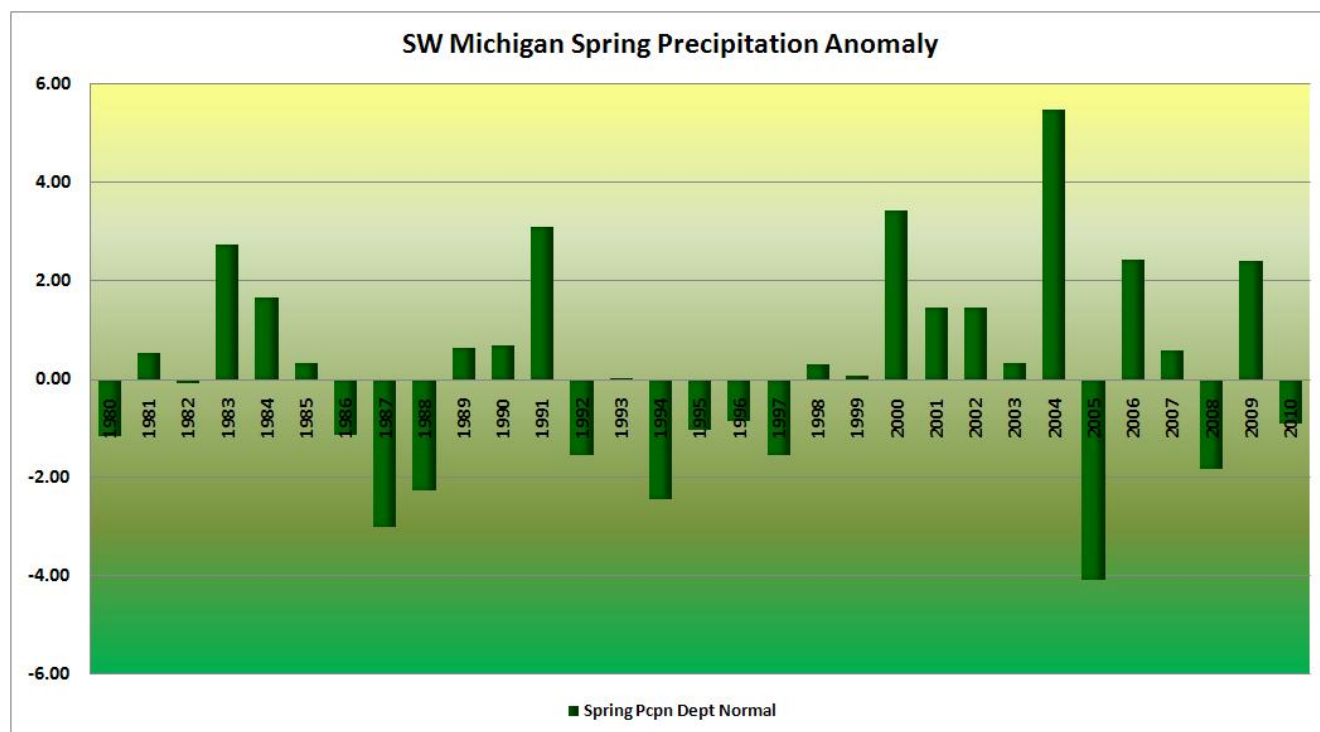


Figure9. Spring precipitation average departure from normal for the 36 long-term climate stations over Southwest Lower Michigan.

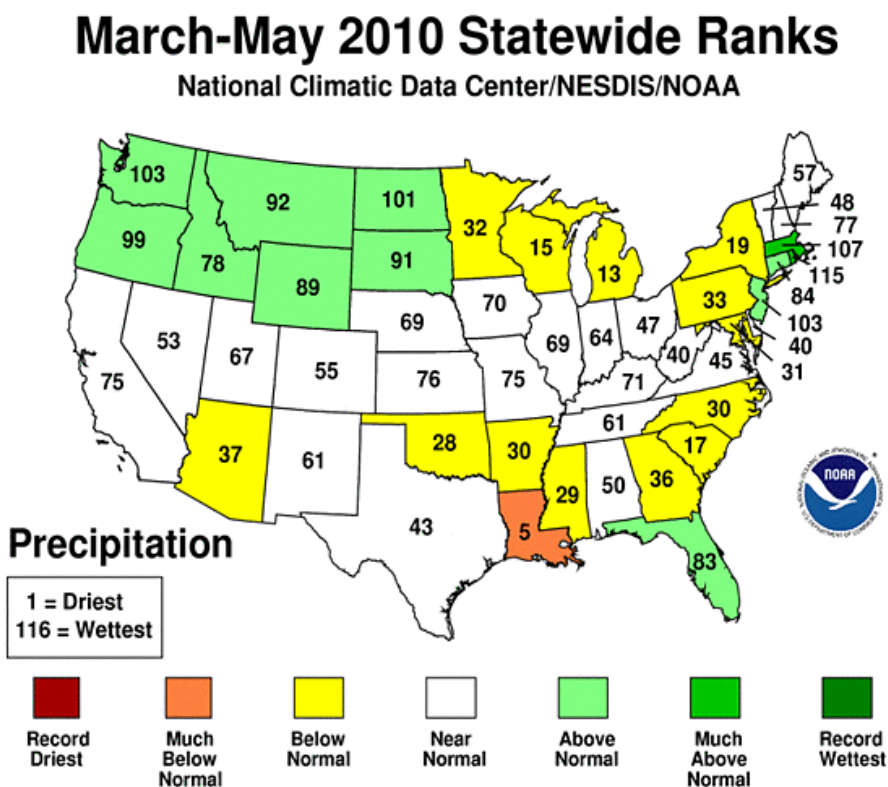


Figure10. NCDC spring precipitation ranking for the contiguous United States

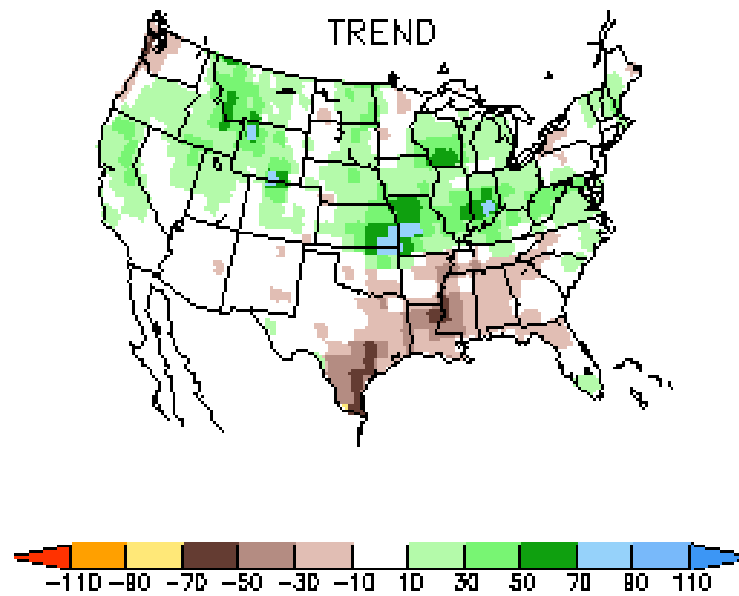


Figure 11. Spring precipitation trend (percent of normal) over the past 15 years for the Contiguous United States (CONUS).

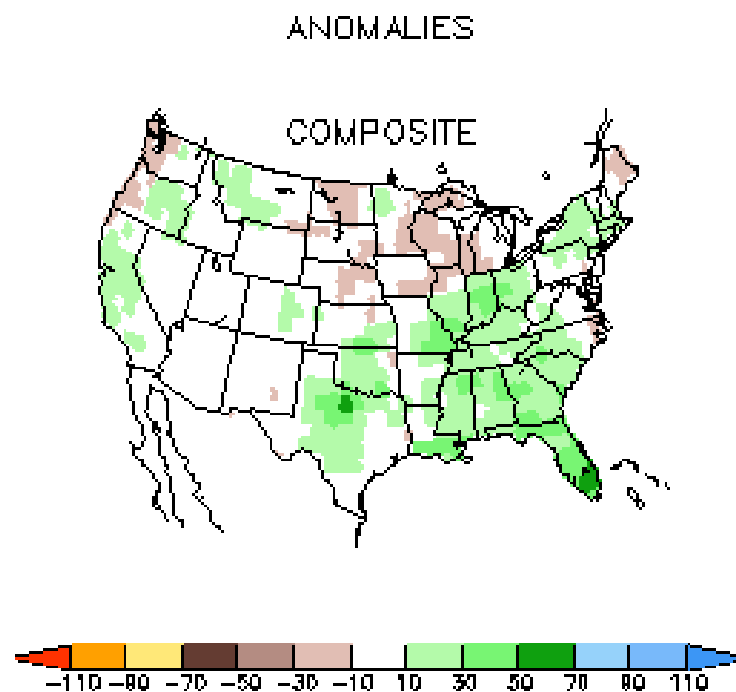


Figure 12. Spring precipitation (percent of normal) during El Niño years for the CONUS.

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At all three primary climate sites, overall rainfall was below normal (Figures 13-15). Rainfall was below normal in March but near normal in April and May. Note how on all three charts at the end of March the red line (normal) is above the actual total for the month

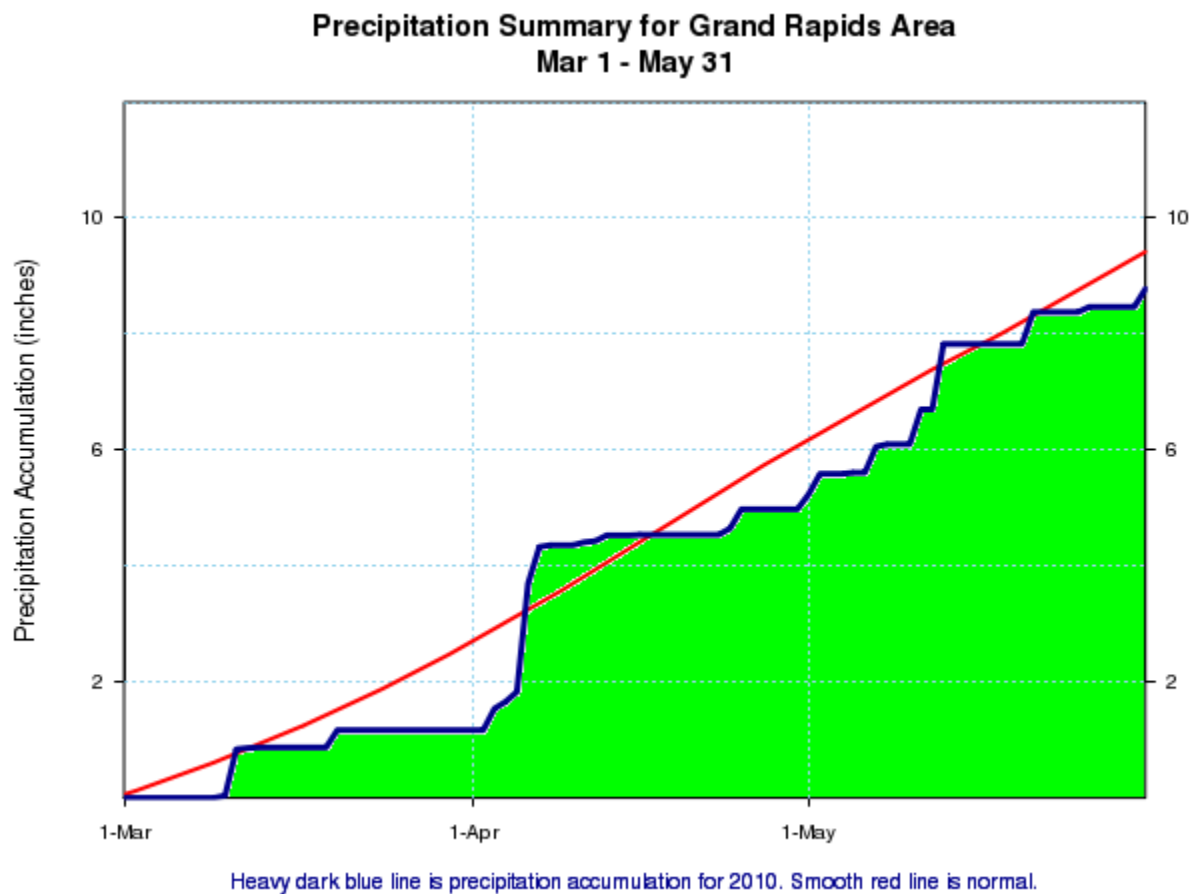


Figure 13. Grand Rapids daily precipitation accumulation for the spring of 2010.

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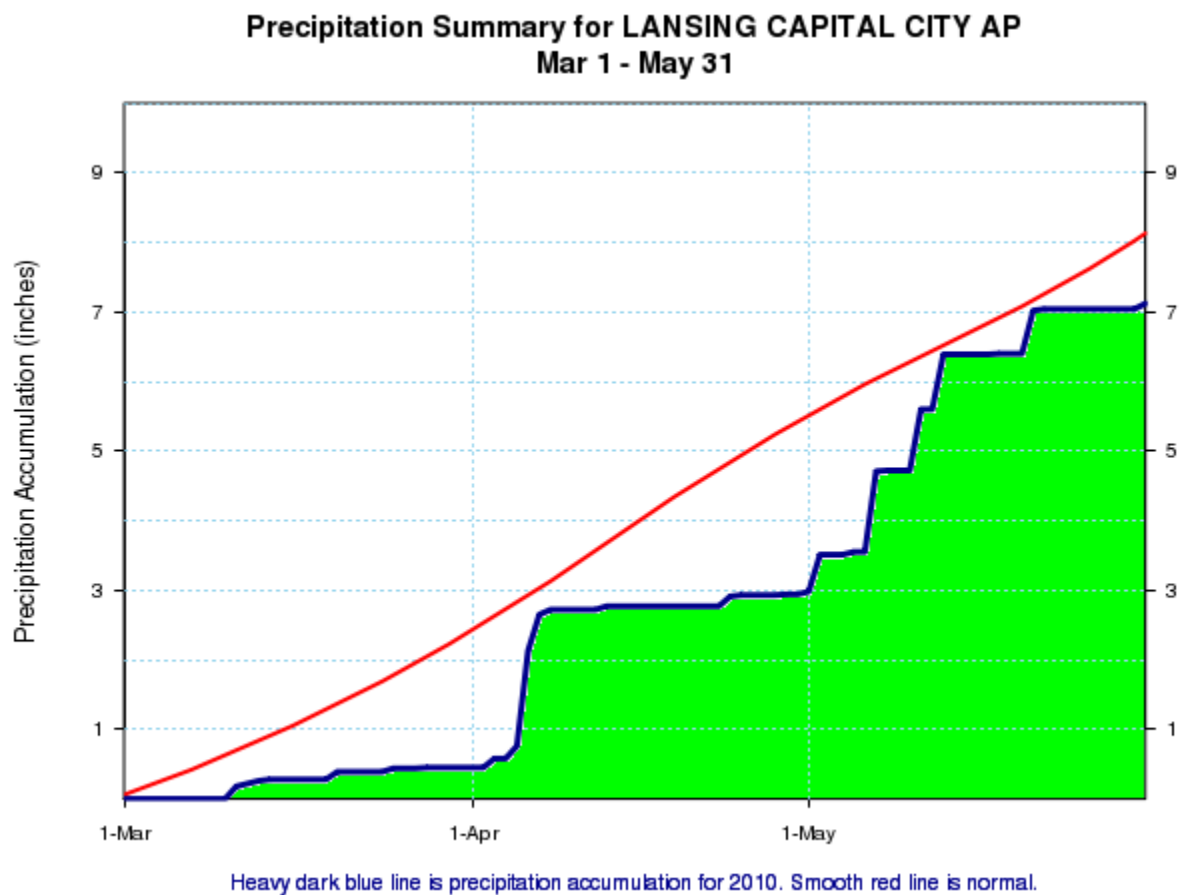


Figure14. Lansing daily precipitation accumulation for the spring of 2010.

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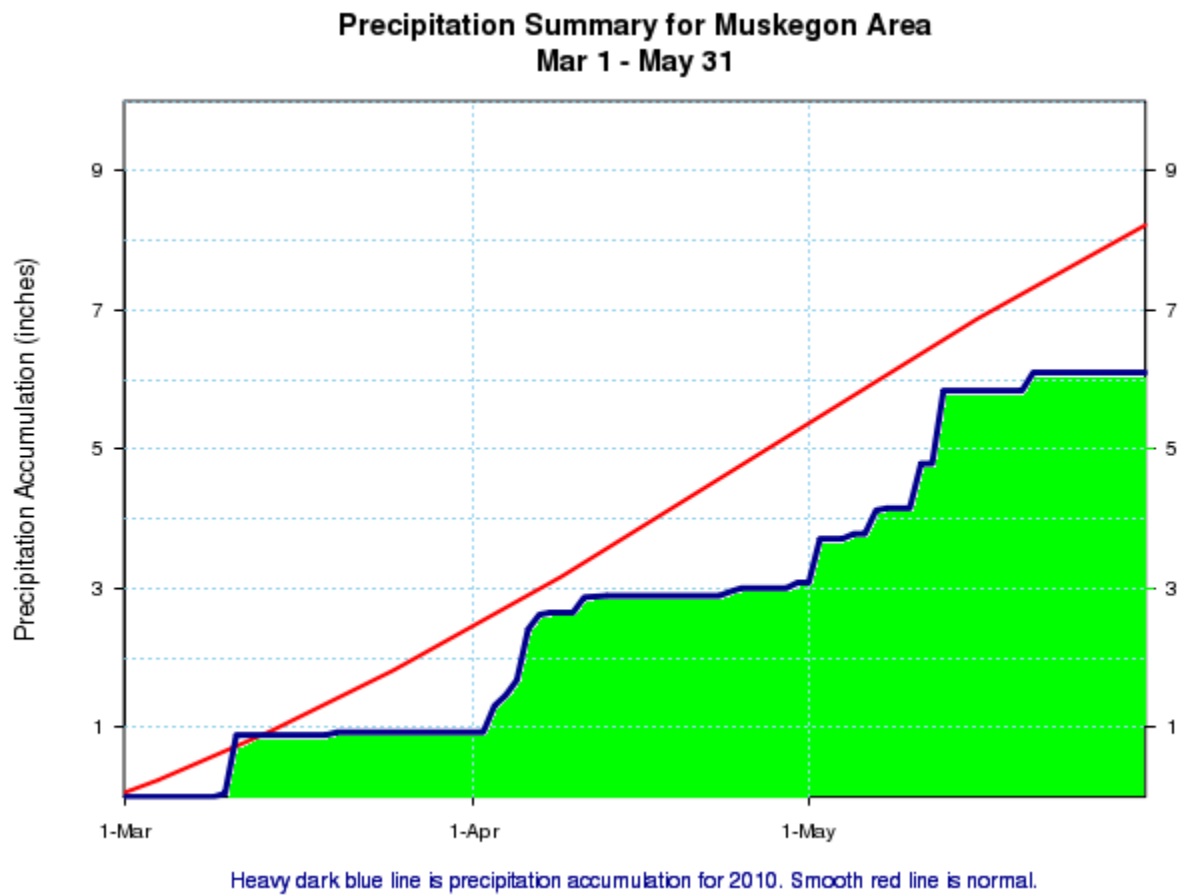


Figure15. Muskegon daily precipitation accumulation for the spring of 2010.

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Spring 2010 Severe Storms for Southwest Lower Michigan:

While the severe weather season was below normal, it was a little more active than the spring of 2009 (Figure 16). There were two episodes of severe storms (defined as at least three severe weather reports within a six hour period) occurring on April 6th and May 31st. The only episode of severe storms in 2009 occurred on April 25th. On average from 2000 to 2010, there are three episodes per spring. The most active spring was 2004 with seven episodes. From 2001 through 2010, four springs had an above average number of severe weather episodes and five springs were below average.

This spring, there were 17 severe storm events over Southwest Lower Michigan (Figure 17). Seven of those severe storms occurred on April 6th and seven during the May 31st episode. The other three events were isolated, consisting of a hail report on April 7th, a wind damage report on May 1st, and another wind damage report event on May 7th. The average number of spring severe weather reports for the 23 County Warning Area (CWA) from 2000 to 2010 is 31. From 1985 to 2010 there was an average of 25 storms per spring. From 2001 through 2010, only four springs had fewer severe reports than 2010. The spring of 1988 was the most active spring with 85 severe reports. In 2004, the spring with the most severe storm episodes, there was 79 reports.

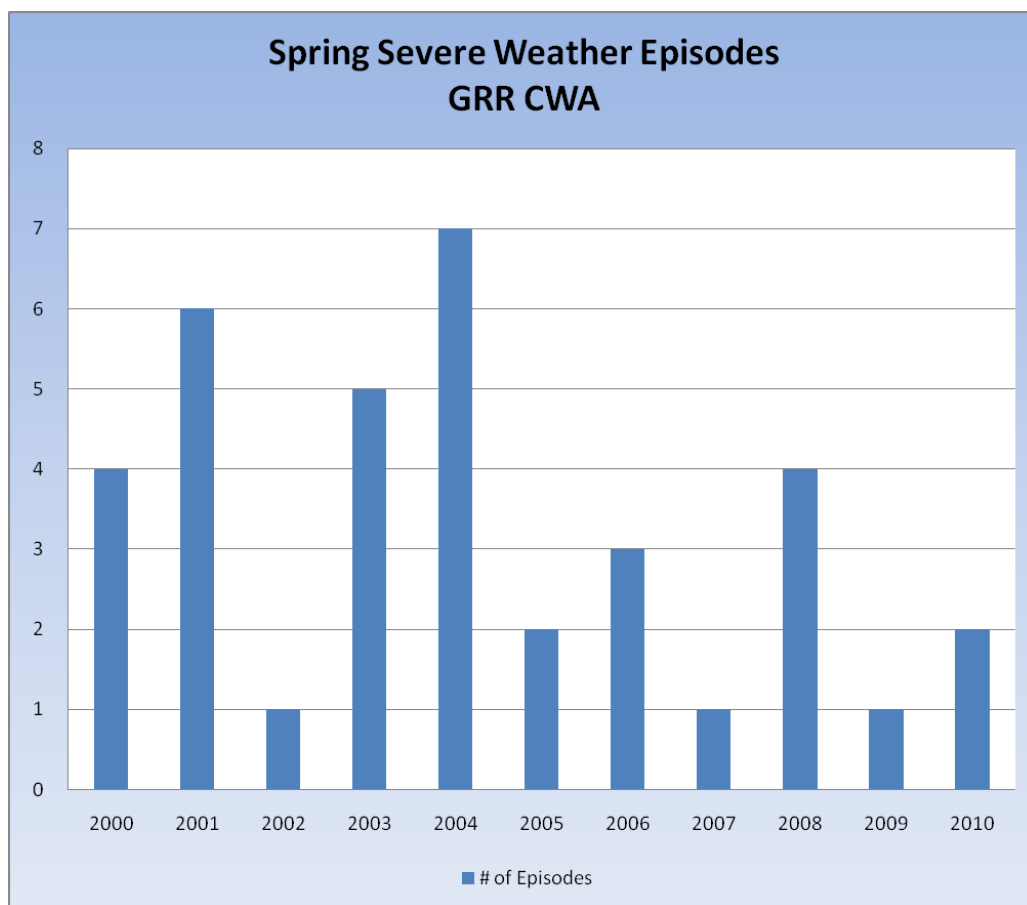


Figure16. The total spring severe storm episodes for Southwest Lower Michigan.

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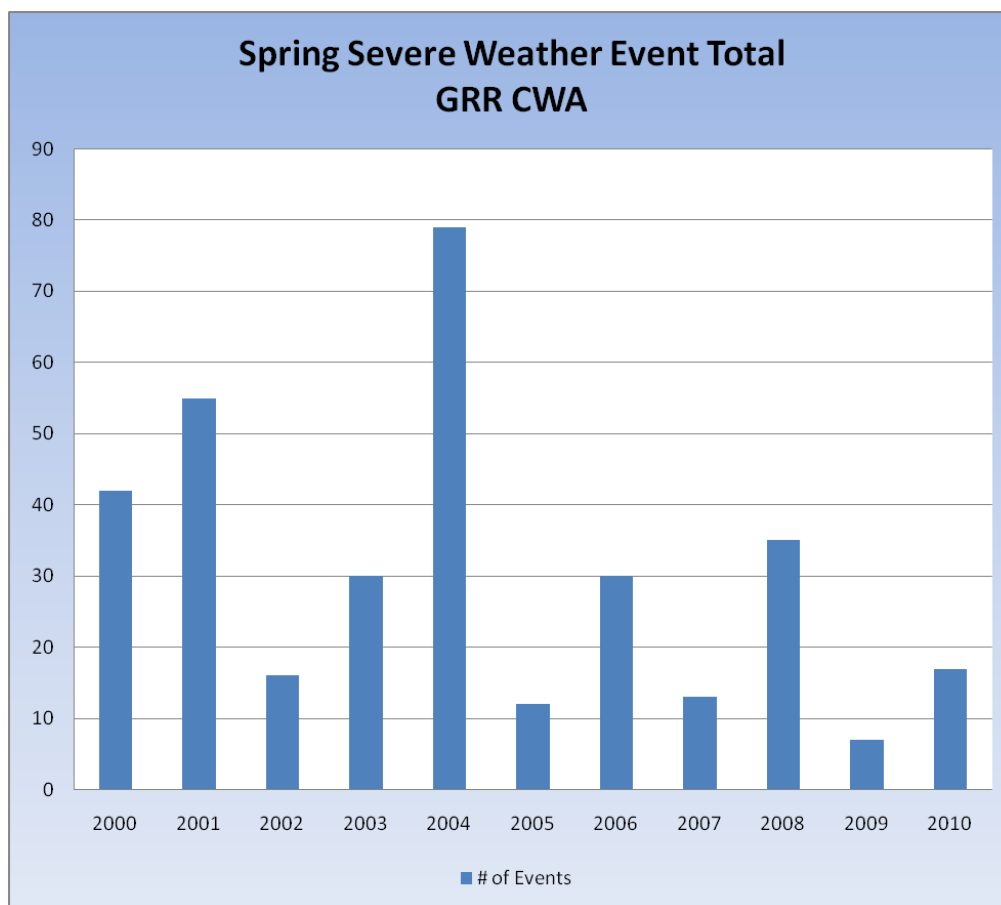


Figure 17. The total spring severe storms by year.

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Spring 2010 Snowfall for Southwest Lower Michigan:

There was only one measureable snowfall between March 1st and May 31st, occurring on the 20th of March when most locations had less than two inch of snow (Figure 18). Consequently, snowfall was well below normal across the area (Figure 19).

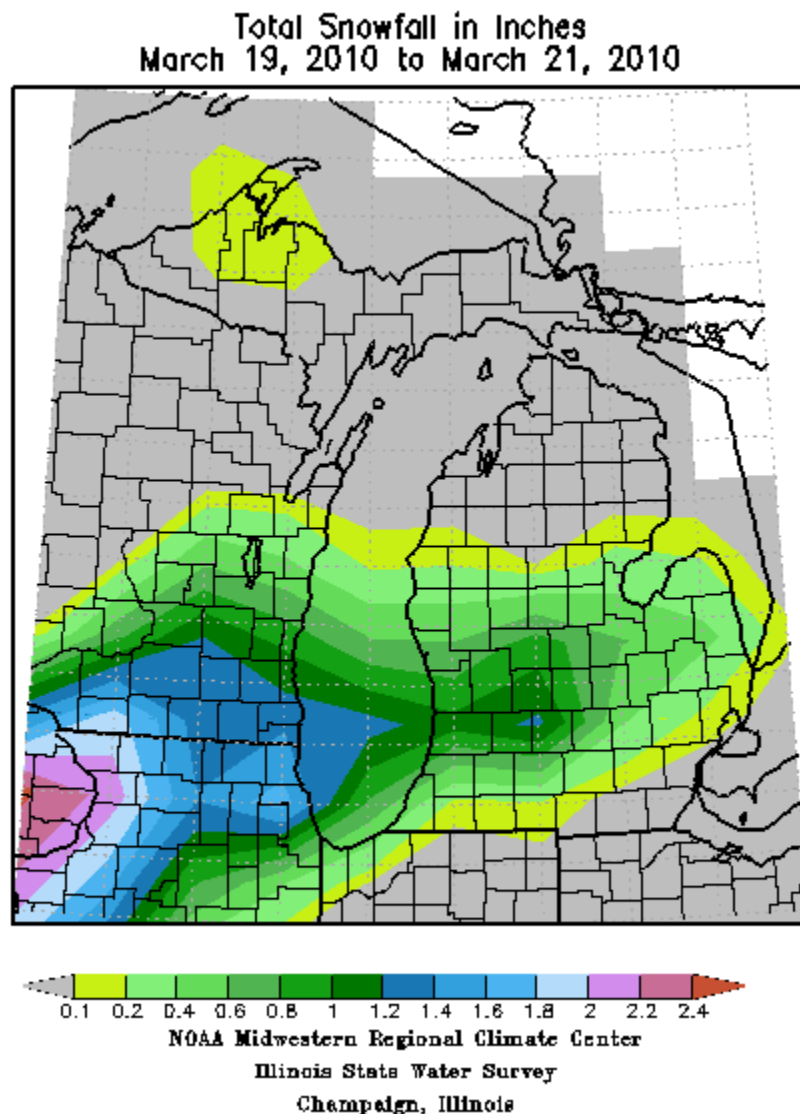


Figure 18. Spring 2010 seasonal snowfall total for Michigan (all occurring on March 20th).

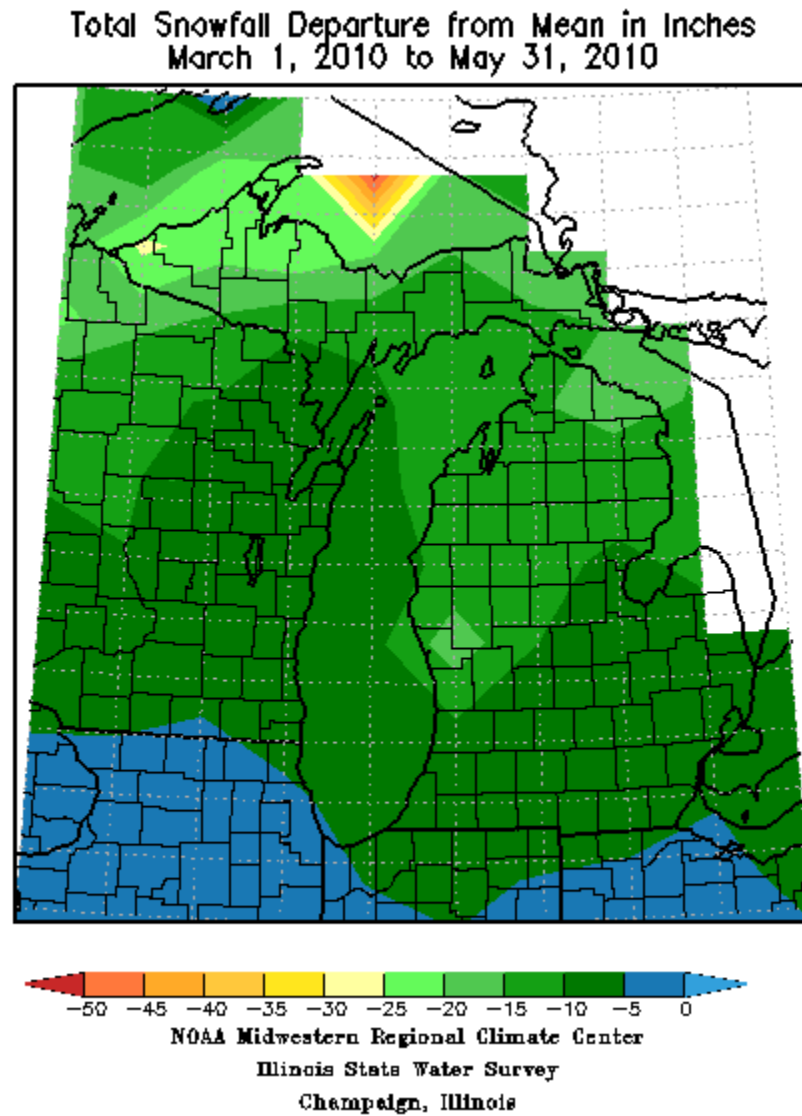


Figure 19. The spring 2010 seasonal snowfall departure from normal.

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For more details on the individual snow events and rainfall events, please see the monthly weather summaries listed below:

March 2010 Climate Summary: <http://www.crh.noaa.gov/images/grr/climate/CS201003.pdf>

April 2010 Climate Summary: <http://www.crh.noaa.gov/images/grr/climate/CS201004.pdf>

May 2010 Climate Summary: <http://www.crh.noaa.gov/images/grr/climate/CS201005.pdf>